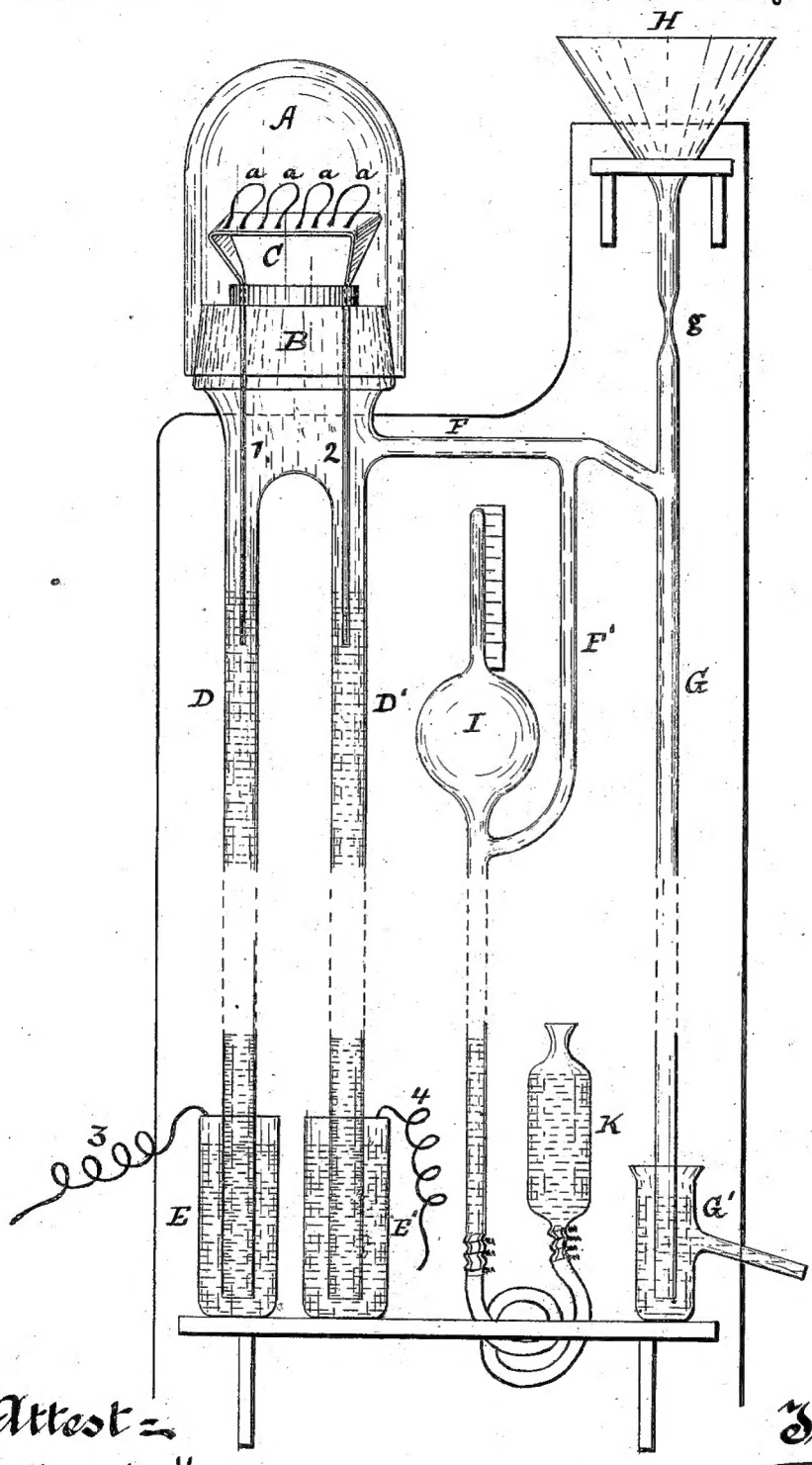
(No Model.)

T. A. EDISON.

METHOD OF TREATING CARBONS FOR ELECTRIC LIGHTS.

No. 298,679. Patented May 13, 1884.



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UNITED STATES PATENT OFFICE.

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METHOD OF TREATING CARBONS FOR ELECTRIC LIGHTS.

SPECIFICATION forming part of Letters Patent No. 298,679, dated May 13, 1884.

Application filed July 3, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Method of Treating Carbons for Electric Lights, (Case No. 221;) and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

As described in prior applications for patents by me made for improvements in electric lights, wherein the light is produced by an incandescent conductor hermetically sealed in a glass globe, the body of the incandescent conductor or carbon is very small—a mere filament or thread—but with enlarged ends for the purpose of affording better contact with the clamps. Preferably these carbons, of horseshoe form, are made of one piece of material, the entire device, body, and thickened ends being unitary and homogeneous, cut or shaped from suitable material and then carbonized. The carbonization is done in a nickel flask, the filamentary bodies being satisfactorily carbonized therein. It sometimes happens, though, that the broad ends are not thoroughly carbonized, as, owing to their greater mass the flasks would melt before the ends had reached thorough carbonization. It is essential that there should be thorough carbonization of every portion of the carbon, that every atom of hydrocarbon should be changed to carbon. If this be not done, the heat and high vacuo to which they are subjected in the lamp gradually throws out any unchanged hydrocarbon, eliminating it from the carbon and causing a deposit on the glass of a hydrocarbon. It is desirable, therefore, that the carbons should be treated by some process which will result in their entire and complete carbonization, and the object of this invention is to furnish a process or method for accomplishing that result. This method consists in subjecting the thickened ends only, but not the bodies, of the carbons, after carbonization in flasks, to a high heat *in vacuo*.

In the drawing is shown means by which this method may be readily practiced, the drawing being a front view of the apparatus necessary therefor.

B is a base of insulating material, preferably of glass, upon which rests the globe A, the two being so fashioned that their joint is air-tight, the glass surfaces being ground true for this purpose. I do not, however, claim herein the lamp of this construction, since I propose to cover it by a separate application for patent.

Attached to B hermetically are the tubes D D′, of a length somewhat greater than the height of a mercury column *in vacuo*, dipping in their lower ends in the mercury-reservoirs E E′, which seal their lower ends.

Passing through the base B are conductors 1 2, whose lower ends pass into the tubes D D′, reaching a short distance below the top of the mercury columns, and whose upper ends are united by a conductor, C, of a material capable of being rendered incandescent by an electric current—preferably platinum—and broadened on top, so as to form a seat or platform, on which carbon horseshoes may be laid.

From the body formed by the union of the two tubes D D′ a passage, F, leads to the pump, by which the air is exhausted. The pump herein shown is an exceedingly simple one, although any other suitable form of air-exhausting pump may be used. The pump consists simply of a long tube, G, whose lower end dips into a mercury-vessel, G′, provided with an overflow-spout, the upper end being formed into or provided with a mercury-reservoir, H. At a little distance from its upper end the tube G is contracted into a very narrow orifice, *g*, of a size which permits the mercury to fall through drop by drop. At a little distance below *g* the tube F enters G by a downward bend.

Connected to the tube F by tube F′, so as to be in connection with the pump and with the vessel under operation of the pump, is a McLeod gage, I, for determining the degree of exhaustion in A.

In carrying the method into practice the operation is as follows: Upon the platform C are laid the broad ends of a series of carbon horseshoes, *a a a a*, and the globe A placed

on the base B, so that the joint between them is air-tight. The vessels E E and H being filled with mercury, the mercury dropping through *g*, each drop passing the tube F carries a modicum of air with it. As the air is exhausted from A and the tubes D D′ the mercury rises in the latter until, when the proper degree of exhaustion is reached, the mercury rises and contacts with 1 2. The circuit from a source of electric energy passing by 3 to E D 1 C 2 D′ E′ 4 is closed, the platinum C being thereby rendered incandescent, imparting its heat by conduction to the broad ends of the carbons *a a*. These broad ends are kept subject to this heat *in vacuo* until it is judged that they are thoroughly and evenly carbonized, the body of the carbons, on account of the poor heat-conducting qualities of the carbon, remaining unheated comparatively. When the carbons have been thus treated *in vacuo* sufficiently, the shade A is lifted off and the carbons removed and placed in lamps, where they are again subjected to heat in the process of exhausting the air, as detailed in a prior application.

Instead of being heated while *in vacuo* by an electric current, as here described, I have found that the same result may be attained by throwing upon their broad ends the rays of the sun properly focused, so as to raise them to a very high red or to a white heat while *in vacuo*. For this purpose I have used an apparatus like that shown, combined with a heliostatic arrangement adjusted to carry the lens, so that its focus shall remain at the proper spot.

The pump herein shown and described is given as showing means for carrying the invention herein claimed into practice; but no claim is now made to the pump, as such pump will form the subject of a separate application.

It will be seen that the parts shown at the left of the figure, which are connected with the pump by the glass tube F, form an incandescing electric lamp, and can be employed as such independent of their use in the method before described.

The lamp can be disconnected from the pump, as will be readily understood, by "sealing off" the tube F, and the vacuum will be maintained within the lamp by the ground-glass union or joint at the junction of the globe and base.

What I claim is—

1. The method of preparing carbons for incandescing electric lamps having broad or enlarged ends, consisting in first carbonizing the filament, converting its body into carbon, and then subjecting the broad ends or enlarged portions to the action of heat *in vacuo*, substantially as set forth.

2. The combination of a vacuum-chamber, a platform therein for the carbons, an exhausting apparatus, and means for imparting a high heat to the broad ends of the carbons while *in vacuo*, substantially as shown and described.

This specification signed and witnessed this 15th day of June, 1880.

THOMAS A. EDISON.

Witnesses:
S. L. GRIFFIN,
WM. CARMAN.